RFP 500-10-502
Questions and Answers

Acronyms Used in Questions and Answers:

- AB – Assembly Bill
- CCS - Carbon Capture and Storage
- CPR – Critical Project Review
- DOE – United States Department of Energy
- IGCC - Integrated Gasification Combined Cycle
- LLNL – Lawrence Livermore National Laboratory
- NGCC – Natural Gas Combined Cycle
- RFP – Request for Proposals

1. The tentative Contract Termination Date is shown as September 2011 in the RFP Introduction. Furthermore, Attachment 14 A-1 Schedule states that "All work must be completed by DOE's funding deadline of September 30, 2011". Will a proposal response that does not comply with the DOE deadline be certainly rejected? If not, what circumstances would allow consideration of a work schedule extending beyond the DOE funding deadline and how would an extended timeline be evaluated in the RFP response evaluation criteria?
Answer: The proposal will not be rejected based on the schedule. The project's schedule will be scored per technical evaluation criteria 1.e.

2. One of the purposes of the RFP is to provide a preliminary design for a pilot facility. Can this preliminary design be based on a generic technology type without being tied to a named vendor? If a specific named vendor were to be involved in the preliminary design, it could place them at a competitive disadvantage if an RFP for a future competitively bid contract is released, since their design and projected costs will have been made public. Please comment on the level of vendor engagement and expand on the overall intent of the pilot facility feasibility study.

Answer: The overriding consideration for technology selection for the pilot plant is its relevance for full-scale commercial application and the prospect of it being funded by a research organization such as the U.S. Department of Energy's National Energy Technology Laboratory. For a "more common" technology type (e.g., amine solvent post-combustion capture), a generic design may be suitable, whereas for a "more unique" capture approach (e.g., certain types of high-pressure oxy-combustion), engagement with a particular technology developer may be necessary to generate the desired documents and data.

3. Must all subcontractors be named explicitly in the initial proposal, or can they be named later as the evaluation progresses? Is there a contract threshold for requiring named subcontractors?

Answer: No. However, all known subcontractors should be identified so that the project team, to the extent known, is evaluated by the evaluation committee. If additional subcontractors are necessary after the execution of the contract, they may be added per the terms and conditions.

4. Exhibit A Scope of Work (Attachment 13) - (General) To help guide RFP response, can you indicate which tasks/subtasks are considered of higher priority and which are lesser priority to meet the basic RFP needs while still meeting schedule requirements? Are new-build sites and technologies of greater or lesser interest than retrofit of existing sites and appropriate technologies?

Answer: Page 6 of the RFP offers a suggested distribution of the Contractor's level of effort among the tasks. In terms of retrofit vs. new-build applications, both are important, but some technologies will be more suitable, or only suitable, to new-builds, whereas others are applicable to both new-builds and retrofits. The utility partner for the study, Pacific Gas & Electric Co., has expressed a specific interest in retrofit applications.

5. Task 1.10. To meet schedule and budgetary constraints, can the RFP response contain reasonable limits to the number of meetings (PAC, etc.) without being rejected? If so, how would such limits be evaluated in the RFP response evaluation criteria?

Answer: It is expected that only the indicated areas will be modified in the scope of work. The scope of work will be evaluated in accordance with the first criterion of the technical evaluation criteria.

6. Task 2. Task 2.1 (Assessment of Suitability…) is clearly focused on retrofit potential. Are task 2.2 (Basic Evaluation..), task 2.3 (Detailed Evaluation..), task 2.4 (Comparison..) and task 2.5 (Regulatory and Permitting) also focused on technologies applicable to retrofit (per Task 2 title)? If not, to what extent is technology and assessment for New Build expected in this task?

Answer: Tasks 2.2 through 2.5 involve examination of CO2 capture and compression technologies for retrofit and new-build applications.

7. Task 2.1. This task includes an assessment of the suitability of subsurface geology for sequestration. Please describe the level of detail expected.

Answer: Lawrence Livermore National Laboratory is the project partner responsible for developing two three-dimensional geomodels of the subsurface for this project. The California Geological Survey has defined California deep sedimentary basins that are considered candidates for long-term geologic storage of CO_2 in dense phase conditions. Reviewing and understanding their efforts is expected of the Contractor, but little original subsurface evaluation is expected.

8. Task 2.2. Please confirm this task is focused on retrofit applications only (per Task 2 title).

Answer: Capture technologies suitable for retrofit and new-build applications should be considered in the Task 2.2 screening assessments.

9. Task 2.2 Please confirm that the level of maturity of technology for all subsequent tasks is based on the criteria outlined in this task: at least 1 MW (equivalent scale) development by March 2011 and reasonable prospects for 2020 commercial availability.

Answer: The level of maturity of capture technologies to be considered in all subsequent tasks is based on the criteria outlined in this task, namely at least 1 MW (equivalent scale) development by March 2011 and reasonable prospects for 2020 commercial availability.

10. Task 2.3 Please confirm that this task is focused on retrofit applications only (except for "incremental capital cost of implementing the technology on a new unit ($/kW).

Answer: Capture technologies suitable for retrofit and new-build applications should be considered in the Task 2.3 more-detailed assessments.

11. Task 2.3. To help guide RFP response, are there particular CO2 capture technologies that are expected in detailed retrofit evaluations? Are there any technologies that are expected **not** to be included in the detailed retrofit evaluations (for instance, a technology that does not use the F-class gas turbine and steam turbine prime movers)?

Answer: The selection of technologies for further analysis in the Task 2 screening steps will be made jointly based on the Contractor's recommendation and the advice of the Project Advisory Committee, without any technology "pre-selected" in advance. Final selection of technologies will be given to the Contractor by the Energy Commission Contract Manager. It is reasonable to expect, however, that the selected subsets will include a mix of technologies further along the scale-up path, to enable earlier commercial application, and emerging technologies with the promise of superior performance characteristics, but not expected to become commercial as soon.

12. Task 2.4 Please describe the purpose in comparing the technologies selected for NGCC plants (Task 2.3) with other plants (IGCC, PC, etc.).

Answer: This is a benchmarking activity of interest to the power companies subject to AB32 (2006)regulations. They have myriad options for compliance, and have a sense of the cost of NGCC-CCS relative to other power generation alternatives. This "order of magnitude" costing exercise is intended to verify their expectations for NGCC-CCS relative costs.

13. Task 3.2 What is basic criterion (or criteria) to be used by Contractor to recommend site ranking to apply the analysis procedure?

Answer: Representativeness of the equipment configuration at the site for other sites in the state, high capacity factor, substantial remaining life, anticipated economics and ease of permitting.

14. Task 3.3 What are expectations of the range of number of technologies and sites to be selected for applying the analysis procedure in retrofit?

Answer: The exact number will be determined based on the contractor's recommendation and the advice of the Project Advisory Committee, but a "strawman" expectation might be 3 or 4 technologies and 1 or 2 sites. The final number of technologies will be given to the Contractor by the Energy Commission Contract Manager. There is no particular expectation as to the mix of technologies between pre-combustion, post-combustion, oxy-combustion, or emerging technologies (e.g., membranes, beneficial reuse, etc.).

15. Task 3.4 How are the sites for New-Build applications determined? What are expectations of the range of number of technologies and sites to be selected for comparing New-Build Analysis Procedures with and without capture?

Answer: The sites used for new-build engineering-economic assessments should be sites of current or planned California NGCC plants. The spreadsheets of plant characteristics in Attachment 20 include latitude and longitude coordinates for such plants. The exact number of technologies and sites will be determined based on the contractor's recommendation and the advice of the Project Advisory Committee, but a "strawman" expectation might be 2 or 3 technologies and 1 or 2 sites. The final number of technologies will be given to the Contractor by the Energy Commission Contract Manager. There is no particular expectation as to the mix of technologies between pre-combustion, post-combustion, oxy-combustion, or emerging technologies, although it should be noted that some technologies are only practical for new-build units, and thus would be logical choices. Also, if at least one technology is common between the retrofit and new-build assessments, then insight might be provided on a "retrofit difficulty" premium. In this situation, the same site would be used for the retrofit and new-build cases so that the elevation, meteorological design conditions, cooling water characteristics, CO_2 storage options, etc., would be the same and not mask the "retrofit difficulty" differences.

16. Task 4. Must the technology selected for the pilot-scale feasibility study be applicable to both retrofit and new-build applications, or may it be applicable only to new-build applications? Can technologies that currently have or have had pilot-scale and/or demonstration scale projects on NGCC be considered for this task?

Answer: The technology selection for the pilot-scale feasibility study will be a joint activity between the contractor, Project Advisory Committee, and Energy Commission Contract Manager with the primary consideration being its relevance for full-scale commercial application and the prospect of it being funded by a research organization such as the U.S. Department of Energy's National Energy Technology Laboratory.

17. It appears that you are targeting this RFP towards third-party engineering consulting firms that do not themselves offer technology. I just want to confirm my understanding on this point because, as I read the RFP, I am not sure you are looking for suppliers to respond. Any supplier is naturally going to promote their technology. But, the way the RFP reads, you are looking for a firm to assess the market for all available technologies that might be applicable and develop feasibility studies on the three or four technologies that appear most attractive for this application. Can you clarify my understanding on this point?

Answer: Yes, your understanding is correct except that a bidder does not have to be an engineering consulting firm to apply.

18. Section III, Evaluation of Proposal: Will any DOE National Laboratory staff participate in the evaluation of proposals?

Answer: Only California Energy Commission staff will serve on the Evaluation Committee and provide scores for proposals. However, the Evaluation Committee may seek input from technical reviewers from inside and/or outside the Energy Commission that will not have any conflict of interest with the contractors applying to this RFP.

19. Section IV, Schedule of Deliverables and Budget Forms: The information provided in these forms will not be kept confidential. Please clarify this statement. Does it mean that commercial and other sections of the proposals will be posted on the CEC web site, made available upon request, etc.

Answer: All sections of all proposals will become public document after the posting of the Notice of Proposed Award. Some or all of the proposals may be made available online.

20. Task 1.2 Only one CPR meeting scheduled to occur prior to beginning of Task 4 is identified in the Scope of Work. Are there other CPR meetings envisioned?

Answer: Numerous informal meetings with the Project Advisory Committee are envisioned to provide for clarity and feedback, but only one formal Critical Project Review meeting is anticipated. However, as indicated in Task 1.2, the Commission Contract Manager can call additional CPRs as needed.

21. Task 1.5 There are 13 tranches of interim deliverables per scope of work. Fifteen day review duration requirement per each interim tranche of deliverables would result in 13 x 15 days = 195 days, or 39 weeks. This exceeds total project schedule of 26 weeks. Would CEC consider revising this requirement?

Answer: The deliverables and their associated review cycles are not all sequential, meaning that some will take place in parallel. Further, the California Energy Commission is cognizant of the compressed time schedule for this project, and anticipates review of most deliverables in less than 15 days.

22. Task 1.9 Is there a preference on the version of MS products used? While specifications are provided for data sets, documents, project management documents, are there any specifications for the workbooks for tasks 3.3-3.6?

Answer: For Microsoft Office software, there is no preference between Office 2003, 2007, or 2010. For the engineering-economic evaluations, no specific software is required. Adaptation of existing software for similar evaluations (e.g., coal power plants with CCS) is recognized as a viable development pathway.

23. Task 1.10 Please confirm that reimbursement for the PAC members services is not included in Contractor's budget.

Answer: Reimbursement of the PAC members for review services and advice should not be included in the Contractor's budget.

24. Task 1.10 How many days in advance of the PAC meeting do deliverables need to be submitted. Are Task 1.5 requirements in addition to Task 1.10 requirements, i.e. is there additional review time required by the PAC members.

Answer: Task 1.5 and Task 1.10 are completely separate. The schedule of deliverables for the PAC Meeting will be adjusted accordingly once the PAC meeting schedule has been set.

25. Task 1.10 In task 2.3, PAC meeting is to **"…select the technologies to be used for additional *analysis…*"**. Similar requirements are specified in most of the other tasks. Is the intent here that the PAC would have an authority to decide on final outcomes for each task?

Answer: No. The PAC only provides advice. The Energy Commission Contract Manager retains authority over the final outcomes for each task. However, prominent on the Project Advisory Committee will be Pacific Gas & Electric and potentially other power companies, who will be the ultimate users of CO_2 capture and compression technologies for NGCC plants (or buyers of power from others using CCS on NGCC). Thus, the goal is a selection process based on mutual agreement of ultimate commercial viability/competitiveness for the selected technologies.

26. Task 1.10 In reference to the above question, how is decision selection process, by the PAC, envisioned, i.e., by voting, scoring /ranking system, any other methodology.

Answer: The envisioned process involves a discussion of rankings and rationale developed by the Contractor. The mechanics of a consensus-building approach have not been specified.

27. Task 2.1 There is extremely limited geologic information on the offshore basins. Is offshore geologic storage option part of the requested evaluation of geologic storage potential and pilot demonstration conceptual design or is the evaluation limited only to onshore sites (the geologic basins with CO2 storage potential identified in the WESTCARB GIS site)?

Answer: It is true that information on offshore reservoirs is largely limited to areas that have been explored for oil and natural gas production. There is no obligation to consider offshore basins, but in the event that a coastal NGCC plant site is chosen for evaluation, and offshore sub-seabed storage appears more practical than onshore storage beneath a populated area, there is no reason not to consider it.

28. It is not clear as to how much in-depth geologic information will be provided by WESTCARB partnership. Please explain if there will be additional detail on each geologic basin presented in the WESTCARB Draft NGCC report or shown on the WESTCARB interactive map. For example, will the suitable formations and caprocks in each basin be identified? With there be information on detailed stratigraphy, candidate storage formation properties such as depth, thickness, permeability, porosity, geologic structure, and well logs from representative wells from the work done by WESTCARB and their team members such LLNL, LBNL, California geological survey etc.? Any information on storage capacity and modeling in the selected locations from WESTCARB member entities? Will the selected team have access to geologic mapping work being performed by such entities to expedite expanded geologic screening report in a short project time frame?

Answer: Lawrence Livermore National Laboratory will be developing three-dimensional static geomodels for two locations of approximately 50 km square. The geomodels are developed from publicly available well logs, core samples, seismic surveys, and geological survey maps, and

typically include formation thicknesses, depositional type, and known geophysical and geochemical properties; where practical, supporting data or data references are provided.

29. Task 2.2 A draft of the WESTCARB Preliminary Assessment Paper (Attachment 20) contains a "Summary of Known CO_2 Capture Technologies". This paper is referenced in Task 2.1. Is it a mandatory requirement that the evaluation in Task 2.2 consider at a minimum the technologies listed in the WESTCARB paper?

Answer: No, the document is intended as a reference, and the Contractor should use its own judgment in selection of processes for consideration. The RFP's criterion of a technology being at 1 MW equivalent scale by 2011, for example, was not considered during compilation of the processes in the "Summary of Known CO_2 Capture Technologies" paper.

30. Task 2.3 Is Task 2.3 evaluation of a retrofit or a new-build?

Answer: The most important outcome of this subtask is a fair relative comparison of the capture processes, and this is probably more readily done on a new-build basis. In the event that the Contractor already has a retrofit model that can be used for the comparisons, they should discuss use of his model with the California Energy Commission contract manager.

31. Task 2.4 Is Task 2.4 evaluation of a retrofit or a new-build?

Answer: Similar to Task 2.3, the most important outcome of this subtask is a fair relative comparison of the cost of low-carbon power from various fuel/generation and capture processes. Given that there isn't a sizeable fleet of California IGCC or waste-to-energy plants, it makes sense to conduct this analysis on a new-build basis. The exception would be gas-fired steam plants, which no one is building, and would only make sense on a retrofit basis.

32. Task 2.4 Is the intent of this task to develop hypothetical design cases for each of the listed technologies, or should the data be taken from publicly available sources?

Answer: Whichever would be the most expedient means of creating fair relative economic approximations among low-carbon power systems using industry-standard metrics (e.g., $/MWh on a levelized 30-year basis).

33. Task 2.4 Some of the listed technologies (such as waste-to-energy boilers fired with biomass or refuse derived fuels) tend to have much smaller electric output than 550 MWe. Is the intent of task 2.4 to evaluate hypothetical designs of such technologies scaled to 550 MWe?

Answer: No, the intent of Task 2.4 is to establish fair relative comparisons using an industry-standard metric, such as the levelized $/MWh on a 30-year basis, for units in the anticipated commercial size range. For IGCC power systems, the expectation would be a dual-train plant with an output similar to a 2 x 1 NGCC plant.

34. Task 3.1 Is the intent of this task to develop detailed procedure templates similar to IRS tax forms with instructions or a block/flow diagram level which would be expanded in Task 3.3?

Answer: Task 3.1 is the development of a model and calculational methodology, and Task 3.3 is the exercise of that model using specific capture process and plant site data. The "model" can be a combination of custom-built and commercial software products. The U.S. Department of Energy National Energy Technology Laboratory (NETL) documents referenced in the Scope of Work provide an indication of the types of models deemed suitable for conducting the requested engineering-economic evaluations. The model is a core foundational element of the work requested in the RFP and its distinguishing characteristics, features, and attributes should be clearly delineated in the proposer's submission.

35. Task 3.3 Deliverable: Is this deliverable envisioned as a spread sheet that performs calculation for the templates developed in Task 3.1 (similar to TurboTax software with user inputs linked to automated calculation and data access)

Answer: The deliverable is the output for technology- and site-specific "cases" analyzed by the model. The "calculational engine" used to produce the outputs is the model developed in Task 3.1. The deliverable for Task 3.3 also entails drawings and other documents that may not be direct outputs of the model.

36. Task 3.5 Deliverable: Is the sensitivity analysis workbook envisioned as an extension or part of the Engineering Options Analysis Workbook

Answer: The sensitivity analyses requested in Tasks 3.5 and 3.6 are variants on the cases analyzed in Task 3.3, which in effect involves rerunning the model for parametric changes in key variables and assessing the effect on the output of uncertainty for those variables.

37. Task 4.1 reads: If feasible, adapt the process flow diagrams, heat and mass, balance, water balance, layouts, and other information **developed in Task 3.2** to reflect the scale of the proposed pilot project, and provide them as attachments to the executive summary. Should this be **"…developed in Task 3.3 …**". Task 3.2 deliverable is Paper with ranked List of Sites.

Answer: YES, it should read "developed in Task 3.3."

38. Task 4.3 Deliverable: This task goal is listed as "…to determine the feasibility of the proposed site…". Does the feasibility study also include evaluation of a test program and lifetime costs of the pilot facility? Please clarify term "validation test".

Answer: Depending on the setting of the pilot plant, the value and application of the CO_2 captured, and the terms of any "early mover" incentives, the pilot plant may or may not have commercial value following operation for a period sufficient to "prove" the technology and provide for collection of test data (i.e., the "validation test" period for which operations would be supported by a research funding organization such as the U.S. Department of Energy's National Energy Technology Laboratory).

39. Task 4.1-4.3 Is project described in tasks 4.1 – 4.3 envisioned as: a small pilot scale facility that captures CO_2 from a slip stream of an existing NGCC, or does a plant need to be designed to capture CO_2 from a total flow of an existing NGCC unit flue gas, or does the scope of design of a pilot facility should include a new-built NGCC unit equipped with CO_2 capture system?

Answer: The pilot does not need to capture the total flue gas flow, and would be unlikely to do so (for cost reasons) except in the instance where the site was a "PURPA scale" cogeneration unit. Except in the instance where a funding organization explicitly called for a new-build CCS-on-gas concept, the pilot is envisioned as a retrofit to an existing gas-fired facility to speed its permitting, construction, and operation.

40. There are 36 plants evaluated in the draft assessment paper. Can the Energy Commission confirm that this is the total number of plants to be evaluated in task 2.1? If storage on site is not feasible for a given plant, how many alternative storage sites are to be evaluated?

Answer: The plants listed in the Attachment 20 spreadsheets constitute the full list of plants for the Task 2.1 screening activity. If a suitable CO2 storage formation does not underlie the plant site, only one or two practical storage alternatives need be considered. If CO2-enhanced hydrocarbon production is a practical option, it should be considered. If not, saline formation storage is sufficient.

41. Can the Energy Commission give any guidance with respect to the desired minimum CO_2 capture efficiency? What role will the Energy Commission play in facilitating access to the data regarding:

- The CO_2 capture processes listed by WESTCARB (attachment 20, task 2.2, 2.3).
- The data of the plants listed by WESTCARB (attachment 20, task 2.1, 3.2).
- The data regarding injection basins indicated by WESTCARB (attachment 20, task 2.1).

Will contractor be required to contact relevant parties directly without any assistance from the Energy Commission?

Answer: There is no minimum specified capture efficiency. Instead, the Contractor should assess the logical or economically practical capture options for a given technology. For example, a particular capture process may use a discrete number of "stages" (typically one or two) and thus these would be the design bases for analysis. The Contractor is expected to investigate capture process options independently of information provided by the California Energy Commission or its contractors.

42. What will be the role of WESTCARB in this project? Will WESTCARB facilitate e.g. in data provision?

Answer: WESTCARB is a project managed by the California Energy Commission that involves Lawrence Berkeley and Lawrence Livermore National Laboratories. Lawrence Livermore National Laboratory will be producing two three-dimensional static geomodels as part of this project. California Energy Commission WESTCARB personnel will manage this contract, and WESTCARB contractors will be on the Project Advisory Committee.

43. When will the Energy Commission issue the RFP to fully design the pilot plant? When does CEC expect it to be built?

Answer: Engineering, construction, and operation of the pilot plant is an envisioned, but currently unfunded, separate Scope of work that would not commence until after the conclusion of this contract.

44. Will LLNL be assessing the geology of only 2 sites? And therefore by default will task 3 only be focused on 2 specific sites and no more?

Answer: Present expectations are that Lawrence Livermore National Laboratory funding will be sufficient for development of two three-dimensional static geomodels of 50 kilometer square dimensions. For some locations, an individual 50 km x 50 km model would encompass multiple NGCC power plants, and thus it is possible that more than two total power plant sites could be examined in the Task 3 engineering-economic evaluations. This situation is most likely to arise if a "planned" plant (which would be used for a new-build analysis) were located near an existing plant (which would be used for a retrofit analysis).

45. I presume that reaching 3% DVBE is required for the effort and that any proposal that does not include plans for 3% or more DVBE participation will not be considered. Is that correct?

Answer: Any proposal not meeting the required minimum 3% DVBE participation will be considered non-responsive and shall be rejected in accordance with the Grounds to Reject a Proposal section located on page 16 of the RFP.